PERSONALITY, SELF-EFFICACY, AND BARRIERS TO PARTICIPATION IN A HEALTH PROMOTION PROGRAM

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Abstract

Organizations are increasingly becoming aware of the importance of fostering a healthy workforce. Health promotion programs, wellness programs that address a range of health-related behaviors, can be very beneficial for both employees and organizations, but only if the employees use them. Although corporations are offering such programs to employees, many individuals choose not to participate. The reasons for this non-participation are not yet fully understood, especially from a psychological perspective. The present study examined the relationship between perceived barriers to exercise and participation in a health promotion program, and the influence of self-efficacy and Five Factor Model personality traits on this relationship. It was proposed that personality would influence the perception of barriers to exercise and self-efficacy would moderate the relationship between barriers and participation. Hierarchical regression and multiple mediation analyses were conducted to test hypotheses regarding the relationships between personality, barriers, self-efficacy, and exercise-related outcomes. Results showed little support for the hypotheses but did allow for the expansion of knowledge in this particular area of research on exercise and health-related behaviors.

TABLE OF CONTENTS

LIST OF TABLES

Personality, Self-Efficacy, and Barriers to Participation in a Health Promotion Program

Chronic illness affects thousands of workers each year and, in turn, costs corporations billions of dollars in healthcare costs. According to the National Health Care Consortium, it is projected that by the year 2020, 157 million Americans will have chronic illnesses causing medical costs to exceed $1 trillion yearly (Fogarty, 2007). Statistics such as those cited in the Fogarty report are motivating employers to actively promote healthier lifestyles for their employees. Beyond economic considerations, if workplace health promotion programs, "can be demonstrated to have even a small intervention effect on individual employees, this has the potential to produce a substantial improvement in health outcomes across the whole community" (Oldenburg & Harris, 1996, p. 226).

Accordingly, work-sponsored health promotion programs are becoming increasingly popular in today's corporate world. Health promotion programs are loosely defined as, "broader wellness programs that address a range of health-related behaviors…that attempt to lower employee health risks through exercise, hypertension control, weight control, smoking cessation, as well as stress management" (Ganster, 1995, p. 24). There is no standard health promotion program; it is a flexible concept that must be tailored to suit the needs of a particular workplace. This means there is a need for guidance to organizations regarding best-practices in the implementation and maintenance of such programs.

As noted by Kruger, Yore, Bauer, and Kohl (2006), the workplace is an especially appropriate setting for health promotion activities because of the amount of time people spend in these environments. Worksites are also considered ideal locations for health promotion due to convenience for the employee, existing channels of communication, opportunities for developing exercise behavior norms within the company, established corporate standards of behavior, and existing social support networks for exercise adherence (Shephard, 1996; Jaffe, Lutter, Rex, Hawkes, & Bucaccio, 1999). One theory that is often used when researching health promotion is the Social Cognitive Theory (SCT). Albert Bandura (1998) reported, "Social cognitive theory addresses the sociostructural determinants of health as well as the personal determinants. A comprehensive approach to health promotion requires changing the practices of social systems that have widespread detrimental effects on health rather than solely changing the habits of individuals" (p. 623). In line with Social Cognitive Theory (SCT), the workplace may be an ideal setting for fostering improvements in personal healthy lifestyle behaviors because of SCT's focus on increased peer and social support and the opportunity for incentives and encouragement (Oldenburg & Harris, 1996).

Participation in health promotion programs has also been shown to benefit both the employee and the organization. For example, Blair, Jacobs, and Powell (1985) found that benefits for the individual attributable to regular physical activity include reduced risk of cardiovascular disease, increased self-esteem, lowered levels of stress, and weight maintenance. Goetzel and Ozminkowski

(2008) report that, "today, many employers associate poor health with reduced employee performance, safety, and morale" (p. 306). Organizations which implement health promotion programs can reap many benefits that often include a reduction in employee absenteeism, reduction in health care costs, a reduction in employee turnover, and an increase in worker productivity (Tsai, Baun, & Bernacki, 1987; Warner, Wickizer, Wolfe, Schildroth, & Samuelson, 1988).

Personality and Exercise

In a review of employees' participation in health-related physical activity, Schwetschenau, O'Brien, Cunningham, and Jex (2008) pointed out that several theoretical models have attempted to explain when and why people engage in physical activity. As separate theories, none of these has been able to consistently predict a person's physical activity level. However, individual variables within each model have shown good predictive ability of physical activity across multiple studies (Schwetschenau et al., 2008).

One general type of these predictive constructs is personality. In the exercise literature, personality characteristics, particularly the traits within the Five Factor Model (FFM) of personality, are considered to be a good predictor of a person's likelihood to initiate, participate, and maintain exercise behaviors (Lochbaum, Bixby, & Wang, 2007). Definitions of personality are numerous, however, they all encompass a similar conceptualization of traits, "enduring and consistent individual-level differences in tendencies to show consistent patterns of thoughts, feelings, and actions" (Rhodes & Smith, 2006, p. 958). Cognitive variables (i.e., personality variables) are targeted by researchers, in particular,

because they may be more amenable to change when compared with demographics (Brown, 2005).

The FFM is a personality trait theory that views human nature from the perspective of consistent and enduring individual differences across five core dimensions: conscientiousness (the tendency to be ordered, dutiful, self-disciplined, and achievement oriented), extraversion (the tendency to be sociable, assertive, energetic, seek excitement and experience positive affect), openness to experience (the tendency to be perceptive, creative, reflective and appreciate fantasy and aesthetics), agreeableness (the tendency to be kind, cooperative, altruistic, trustworthy, and generous), and neuroticism (the tendency to be emotionally unstable, anxious, self-conscious, and vulnerable) (McCrae & John, 1992; Rhodes & Smith, 2006).

Given that personality is so influential over the behaviors and cognitions of individuals, it is plausible that personality may also greatly affect the way people view exercise. From this perspective, it is believed that personality affects a person's exercise habits by contributing to their overall motives for exercise, the way they perceive barriers to exercise, and the type of exercise in which they choose to participate (Courneya & Hellsten, 1998, p. 626). Existing research on personality and exercise paints a somewhat ambiguous picture as to which of the FFM traits is the best at predicting participation or adherence in a health promotion program. Lochbaum et al. (2007), report that investigations have consistently shown extraversion to be an excellent predictor of health-related behaviors. Other studies have shown conscientiousness and openness to

experience to be positively related to exercise behavior (Courneya et al., 2002; Courneya & Hellsten). Lochbaum et al. (2007) also found emotional stability to be an inconsistent, although, sometimes significant predictor of exercise.

Apart from having a direct relationship with exercise behaviors, personality characteristics may also affect the way in which individuals view barriers or impediments that keep them from exercising. For instance, it has been shown that someone who scores highly in the personality constructs of conscientiousness and extraversion would be more likely to overcome particular exercise barriers because they would feel, "a sense of control over engaging in physical activity through intention" (Rhodes & Smith, 2006, p. 963). Courneya and Hellsten (1998) found that the FFM personality traits had a strong relationship to exercise barriers, leading them to conclude, "that personality in general and the [FFM traits] in particular, may be most helpful in understanding barriers to exercise" (Courneya & Hellsten, 1998, p. 631). Courneya and Hellsten also reported that more research on personality is needed so that the relationship between exercise and personality can be better understood.

Personality is thought to influence the perception of barriers to exercise by influencing an individual's perception of and response to physical activity barriers. Rhodes et al. (2006) suggest that behavioral action is unlikely to arise directly from personality, but that personality influences behavioral perceptions, expectations, and cognitions, which in turn may lead to behavioral (in)action. Several models have been developed to explain the effect personality has on health behaviors. One such model is the health-behavior model (Wiebe & Smith,

1997). This model suggests that the main effect of personality on health behaviors is mediated by the quality of a person's experiences. More specifically, personality is hypothesized to affect our social cognitions (perceptions, attitudes, and self-efficacy) towards a behavior, which then may influence the health behavior itself (Rhodes et al., 2006). Extending this consideration of intervening factors studied in previous research, the present study will examine the effects each of the FFM traits has on the way an individual perceives barriers to participation in a health promotion program.

Personality and Barriers to Exercise

Although workplace health promotion programs have demonstrated significant positive returns for employees and organizations, they are often plagued by low participation rates (Bungum, Orsak, & Chng, 1997). A person can choose not to participate in a health promotion program for a number of reasons. Buckworth and Dishman (1999) reported that these reasons in general can include demographics, cognition, behaviors, the social environment, and the physical environment. Because barriers can take so many forms, organizations that implement health promotion programs need to be aware of these barriers and how they may be preventing employees from participating.

Barriers to participation in a health promotion program can, "vary from simple logistics to subtle resistance" (Milano, 2007, pg. 30), including the following logistical barriers:

> Little promotional material describing available options, confusing activities and services, generic health messages, rather than specific,

> personalized information, programs not targeted at those who need them most, insufficient encouragement from managers or co-workers, services available only at inconvenient times or locations, and no time off for lengthy procedures, including diagnostic tests. (p. 30)

Barriers to participation can also be broadly classified in terms of environmental, cognitive, perceived, or actual factors (Marcus, Bock, & Pinto, 1997). Perceived barriers have been defined as an individual's assessment of potential obstacles that they feel could interfere with health behaviors (Schwetschenau et al., 2008; Janz & Becker, 1984; Dishman, 1985; Steinhardt & Dishman, 1987). Common barriers to exercise reported by employees include, "being too tired, having no interest, having no time during the workday, having no time before or after work, already being involved in other programs, and not wanting to participate in such programs with co-workers" (Kruger et al., 2006, p. 439).

Research has shown that both actual and perceived barriers to participation consistently predict a person's amount of participation in physical activity (Sallis, Hovell, & Hofstetter, 1992). The reliability of barriers as important predictors of reduced physical activity is consistent with well-developed learning theory principles (Schwetschenau et al., 2008; Haynes & O'Brien, 2000). As applied to exercise, these learning theories consider barriers as adverse events that precede, co-occur, and/or follow physical activity. The result of an employee encountering these types of barriers would most likely be a decrease in his/her potential to engage in that same physical activity again (Schwetschenau et al., 2008). The

current study attempts to replicate the findings of Schwetschenau et al. (2008), thus:

> *Hypothesis 1.* Perceived barriers will be negatively associated with exercise-related outcomes.

By studying employees' personalities, researchers will be better able to predict how employees will react to barriers to participation in different health promotion programs. Because no health promotion program will be successful without regular participation, organizations must be aware of participants' reasons for non-participation so that accommodations can be made. Relevant aspects of a person's likelihood to participate in exercise, such as motives, barriers, type of exercise, and the exercise context, are thought to be influenced by personality (Davis et al., 1995; Hartung & Farge, 1977; Potgieter & Venter, 1995; Yeung & Hemsley, 1997). Taking findings from previous research on personality's main effects on exercise-related outcomes and barriers to exercise, the following hypothesis was proposed:

> *Hypothesis 2.* The relationships between FFM personality traits and participation in an exercise program will be mediated by a person's perception of barriers to exercise.

Barriers and Self-Efficacy

Apart from relatively static personality traits such as those included in the FFM, other, potentially more malleable individual characteristics may also influence the impact of barriers to exercise. One such characteristic may be a person's self-efficacy. Self-efficacy is a person's belief that he or she is or is not

capable of performing the behavior necessary to accomplish a specific task or achieve a particular goal (Bandura, 1986; Maddux, Norton, & Stoltenberg, 1986). This characteristic is part of Bandura's (1977; 1986) Social Cognitive Theory, in which Bandura suggests that behavior is influenced by an individual's cognitions as well as by perceptions of the social and physical environment.

When applying Social Cognitive Theory to physical activity, it is important to consider all factors that can influence a person's cognitions, including intrapersonal, interpersonal, and environmental factors (Burton et al., 2007). Social Cognitive Theory also maintains that all processes of psychological change operate through the alteration of the individual's sense of personal mastery or efficacy (Bandura et al., 1977; 1986). Work completed by Bandura and associates along with studies by other researchers have clearly shown that changes in self-efficacy and changes in behavior(s) are highly correlated.

Self-efficacy has also been cited repeatedly in studies as an, "important psychosocial determinant of adherence to regular physical activity" (Shields, Brawley, & Lindover, 2006; McAuley, 1993; McAuley & Blissmer, 2000). Further, self-efficacy has been shown to be an excellent predictor of a person's future behavior (Maddux et al., 1986). When discussing self-efficacy's predictive power, Bandura et al. (1977), stated that, "efficacy expectations are likely to determine how much effort people will expend and how long they will persist in the face of obstacles and aversive experiences" (p. 126). Bandura et al. also believed that, "the stronger the efficacy or mastery expectations, the more active the efforts" (p. 126). Indeed, it has been shown that individuals who are higher in

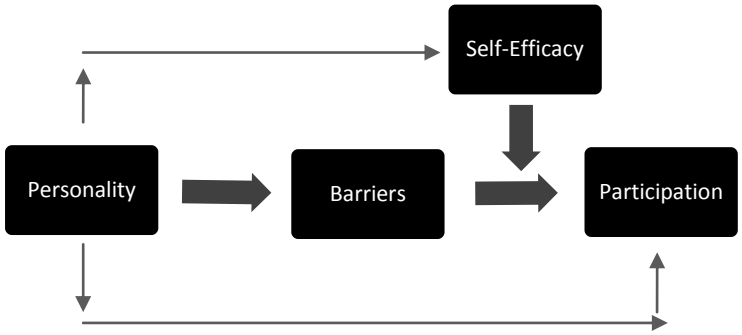
self-efficacy typically have more stability and personal control over their exercise performance (Biddle, Hanrahan, & Sellars, 2001; McAuley & Mihalko, 1998).

Self-efficacy is thought to be a moderating factor in several intention-behavior relationships. Moderators, in the context of health promotion with regards to physical activity, are described as intervening third variables which affect the direction and/or strength of the relationship between the dependent and independent variables. Moderator effects on this relationship leads to the various levels of recorded physical activity of individuals (Bauman, Sallis, Dzewaltowski, & Owen, 2002). Bauman et al. (2002) call for an increase in research on moderating variables in physical activity intervention to allow for systematic improvements in interventions aimed at increasing physical activity.

Building on previous research, the present study examined the moderating role of self-efficacy in the relationship between barriers to participation in a health promotion program and actual participation. It was proposed that a person with high physical self-efficacy would be able to overcome barriers more easily than someone with low physical self-efficacy, and that this, in turn, would lead to higher degrees of participation in a health promotion program.

> *Hypothesis 3*. Self-efficacy will moderate the relationship between perceived barriers and actual participation, such that this relationship will be weaker for individuals with higher levels of self-efficacy than for individuals with lower levels of self-efficacy.

Figure 1. Conceptual Model showing the hypothesized relationships between personality, barriers, participation and self-efficacy.



Method

Participants

Participants were 92 employees from a medium-sized manufacturing organization located in the southeastern United States. This particular organization had a company-sponsored health promotion program and fitness facilities available for employees' benefit and use. Approximately 300 employees at this facility were invited to participate in the current study; the final response rate was approximately 31%.

The sample of respondents was 72% (n = 65) male and 28% (n = 24) female, with a mean age of 45 years (SD = 11.54). Mean organizational tenure was 10.12 years (SD = 9.76). Of all respondents, 73% (n = 65) were married, 19% (n = 17) single, and 8% (n = 7) divorced or widowed. Employees were asked to indicate if they participated in the company-sponsored fitness/wellness program and/or the company-sponsored fitness facility through a self-report measure. Forty-two percent of respondents reported they participated in the company-

sponsored health promotion programs (n = 39); 50% reported they used the company-sponsored exercise facilities (n = 46).

Participants were identified as either "shift employees" (n = 52) or "office employees" (n = 38) of this organization. Both participants and non-participants in the programs and/or facilities were asked to complete the same survey. Data from participants and non-participants were collected via internet survey and/or paper survey. The company-sponsored fitness/wellness program is considered to be part of a health promotion program because the employee's membership is either paid in full or discounted for employees who are participating in their organization's health promotion program. The company-sponsored fitness facility is located on the organization's property and is available for all employees to use. Internal Review Board approval for this project is included in Appendix A.

Measures

All measures as used in this study are reproduced in full in Appendix B.

Exercise program participation. Participants were asked to answer five questions which were used to determine their level of participation. The questions assessed the employees' participation and/or non-participation in the company-sponsored fitness/wellness programs and/or their participation or non-participation in the company-sponsored exercise/fitness facilities.

Questions concerning the participation or non-participation in the company-sponsored fitness/wellness programs and/or the company-sponsored fitness facilities included: "Do you participate (exercise) in your company-sponsored fitness program?" and, "Do you use your company-sponsored

exercise/fitness facilities?" Respondents were asked to indicate their answer with a "yes" or "no". Respondents were also asked to describe the frequency, duration, and intensity of their typical exercise behaviors. The following question were used to assess frequency, duration, and intensity: "How often (times per week) do you use the company-sponsored exercise facilities?", "How long (in minutes) would you say your typical exercise experience lasts?" and "How would you rate your typical exercise experience with regards to level of intensity?". Frequency and duration were measured with an open-ended response option and intensity was measured through a seven-point scale, ranging from 1 (Not at all intense) to 7 (Extremely intense). The variable, "Participation" (coded 1 or 0) was created to describe whether an employee used the company-sponsored exercise facility and/or the health promotion program. "Participation" was entered into each model as a covariate.

Barriers to exercise. Barriers to exercise were assessed using the Exercise Benefits/Barriers Scale (EBBS) developed by Sechrist, Walker, and Pender (1987). Sechrist et al. (1987) defined barriers as factors, both internal and external, which impede physical activity. Although the EBBS is a popular scale for measuring barriers to exercise, it has been found by some researchers to not generalize well to certain populations (Brown, 2005). In response to the lack of generalizability of findings using the EBBS, Schwetschenau et al. (2008), created the Corporate Exercise Barriers Scale (C-EBS) to measure barriers which are perhaps more germane to a corporate setting. The C-EBS consists of 17 items meant to assess specific barriers which people in a corporate setting might

encounter. For the present study, the C-EBS was used to assess perceived and actual barriers to exercise. Participants indicate their level of agreement with each item in the C-EBS using an eight-point Likert scale. The scale ranges from 1 (strongly disagree) to 7 (strongly agree). For the current study, an eighth point was added to the original scale, "N/A".

Typical physical activity. The International Physical Activity Questionnaire (IPAQ)-Short Form (Craig et al., 2003) was used as a measure of health-related physical activity. Specifically, for the present study, the IPAQ is used to measure a participant's level of physical activity during the last week. The short form of the IPAQ is comprised of a total of seven questions which attempt to quantify the time people spend doing physical activities as a part of their everyday lives. The questionnaire is intended for use with young and middle-aged adults (15-69 years). For this study, the self-administered version was used.

The IPAQ questionnaire has acceptable measurement properties for use in international and multiple settings. The IPAQ was scored using the guidelines from Craig et al. (2003). First, any response given in hours or minutes was converted into minutes. This resulted in a total MET score which was then converted by using a square-root transformation to bring the total score closer to normality. Any data which was unreasonably high (i.e., more than 1080 minutes or 18 total hours of active time) was excluded from the analysis. This cut-off point was based on a person having at least six hours of sleep. Data which was typically considered to be unreasonably low (i.e., less than 10 minutes) was retained for the analysis because recent guidelines suggest that effects from

exercise can be cumulative. Analyses for reliabilities revealed that the IPAQ was significantly correlated ($p < .05$) with only one of the personality variables, openness. Because of these findings, the IPAQ was not used in the subsequent analysis of Hypotheses 1, 2, or 3.

Five Factor Model traits. The personality traits of conscientiousness, extraversion, openness to experience, agreeableness, and emotional stability were measured using Ten-Item Personality Inventory (TIPI) (Gosling, Renfrow, & Swann, 2003). This condensed scale includes 10 items, each comprised of a pair of Big 5 Personality traits. Participants were asked to indicate the extent to which they agree or disagree with the pair of personality traits as they relate to their own personality. Cronbach's alpha reliability coefficients were calculated for each pair of personality traits to determine internal consistency. Cronbach's alpha reliability coefficients were .51 for extraversion, .41 for agreeableness, .49 for conscientiousness, .55 for emotional stability, and .10 for openness. Although these alphas are extremely low, the scale was used for the current study because it has been found to be reliable in previous research (Gosling et al., 2003). Also, the fact that there are only two items per trait results in a lower reliability. Gosling et al. report, "the TIPI displayed convergences that were comparable to the other multi-item inventories (mean $r = .77$)".

Self-efficacy. Several forms of self-efficacy have been shown to predict exercise behaviors (Shields et al., 2006). For the current study, *exercise self-efficacy* was measured using a portion of the eating and exercise self-efficacy scale used by Linde, Rothman, Baldwin, and Jeffery (2006). The five questions

concerning exercise self-efficacy was used due to the fact that the present study is examining exercise behaviors. The original 10-item eating and exercise self-efficacy scale developed by Linde et al. (2006) was modified from the Weight Efficacy Life-Style Questionnaire (Clark, Abrams, Niaura, Eaton, & Rossi, 1991). Responses are measured using a scale from 0 (not at all confident) to 7 (completely confident). A Cronbach's alpha reliability coefficient was calculated to determine the internal consistency of the eating self-efficacy measure. This calculation resulted in $\alpha = .91$.

Procedure

Participants completed either a paper and pencil survey ($n = 48$) or an internet-based survey ($n = 44$). Subjects who chose to participate in the study were able to complete the survey at their leisure. Completed internet-based surveys were compiled into one database. The identities of all participants were kept completely confidential. Paper-based surveys were distributed to employees on the same day during one of the organization's previously scheduled monthly wellness meetings. Participants were instructed to take the survey and complete it on their own time. Each participant was given a packet including an informed consent form, a survey, and a pre-paid self-addressed envelope for returning the survey. During the initial meeting, participants were asked to return the completed survey by a given date.

Participants were given approximately three weeks to complete the paper and pencil portion of the survey. Reminders in the form of emails, word-of-mouth, and a re-distribution of the informed consent form were given

approximately two weeks after the initial distribution. Three $30 gas cards were also offered as incentives for any person who chose to place their name into the drawing. Employees did not have to participate in the study in order to have their name placed in the incentive drawing. Participation in the study was completely anonymous for all participants with no identifying information being collected and all data collected was maintained as confidential. This study was a cross-sectional design (using retrospective self-reported information for some measures), therefore, participants were only required to respond at one point in time.

Results

Demographic Comparisons

Participants responded to a survey collecting demographic information. Demographic information (specifically age, sex, marital status, education level, employee type, and participation) was included in all analyses as covariates. Descriptive statistical analyses determined there were no major differences between users and non-users of health promotion programs and/or company-sponsored fitness facilities as far as the demographic variables of age, gender, marital status, education, tenure, or type of employee (shift or office). Thus all respondents were included together in the tests of the hypotheses.

Evaluation of the C-EBS

In an attempt to replicate and/or validate the findings of the original C-EBS research (Schwetschenau et al., 2008) a principle component factor analysis was performed on the C-EBS items using the data from the present study. As in

the original validation study, the item, “I don’t know what exercises to do” was removed due to low loadings and lack of relatedness with other items. An exploratory factor analysis was then conducted resulting in four barrier factors. One additional item was found in this sample to not load cleanly on any factor (i.e., "Traveling prevents me from using the company-sponsored fitness/exercise facilities”). Based on the loadings and the fact that travel was not a regular component of most respondents' job duties within this organization, this item was removed from the pool and a final exploratory factor analysis was conducted.

The final factor analysis yielded a four-factor solution for the C-EBS which explained 66.33% of the variance in the overall set of items. The loadings for these final items are summarized in Table 1. The four factors identified were similar to those found in the original study by Schwetschenau et al. (2008) and were labeled: time/motivation barriers, exercise attitude barriers, external barriers, and internal barriers. All items loaded at .61 or higher. Cronbach’s alpha reliability coefficients were calculated for each barrier factor and were .82 for time/motivation barriers, .80 for exercise attitude barriers, .83 for internal barriers, and .61 for external barriers. These alphas reflect good internal consistency for three of the four factors, time/motivation, exercise attitudes, and internal barriers. The external barriers domain has a satisfactory internal consistency which mirrors the original findings by Schwetschenau et al. (2008). Factor loadings are summarized in Table 1.

***Table 1*. Summary of Factor Analysis for the Corporate Exercise Barriers Scale.**

I am discouraged from participating in my company's sponsored wellness activities or using the sponsored fitness facilities because…	**Time/ Motivation**	**Exercise Attitudes**	**Internal**	**External**
...my job demands don't allow me to take the time to participate	**.722**	-.262	.221	.331
...I don't have time due to family	**.714**	.062	.193	.099
...I'm too stressed	**.760**	.156	.048	.134
...I'm too tired	**.826**	.285	-.035	-.070
...I don't feel motivated enough to work out	**.700**	.318	.015	-.135
...I don't like the way exercise makes me feel	.290	.177	**.713**	.083
...I don't want to improve my health or fitness	.040	.175	**.858**	-.021
...I don't see the benefit of exercise	.003	.359	**.821**	.121
...I am embarrassed to exercise around co-workers	.180	**.867**	.208	.201
...I am embarrassed for others to see my body	.170	**.845**	.150	.163
...I am embarrassed to wear non-professional clothing	.116	**.764**	.190	.366
...my current health problems prevent me from exercising	.099	**.515**	.173	-.066
...membership costs are too high	.106	.238	-.021	**.598**
...the company-sponsored fitness/exercise facility is not nice enough	.000	.117	-.010	**.806**
...fitness/exercise facility hours are inconvenient	.074	-.019	.472	**.658**
...I don't know what exercises to do	.297	.732	.186	-.004
...traveling prevents me from using the company-sponsored fitness/exercise facilities	.350	.212	.200	.250

Note. $N = 92$. No cross-loadings above .47 were observed. Loadings in bold represent the strongest loading and factor placement for each item. The last two items were dropped from the analysis for consistency with previous usage of this scale (Schwetschenau et al., 2008) or unclear loading on any one factor.

Descriptive statistics for all study variables are summarized in Tables 2a and 2b. The zero-order correlations show that there are both significant positive and negative relationships between personality variable, barriers to exercise, and exercise-related outcomes. In the present study, the IPAQ total scores did not correlate with any of the exercise-related outcomes of frequency, duration, or intensity. To test these relationships further, Hypotheses 1, 2, and 3 were analyzed.

Table 2a. **Descriptive Statistics for All Main Study Variables.**

	M	*SD*
Age	44.29	11.51
Education	3.18	1.15
Extraversion	4.36	1.61
Agreeableness	5.59	1.28
Conscientiousness	5.70	1.41
Emotional Stability	5.27	1.48
Openness	5.20	1.14
Time/motivation barriers	3.18	1.52
Exercise attitude barriers	2.06	1.35
Internal barriers	1.70	1.09
External barriers	2.21	1.47
Exercise self-efficacy	3.41	1.51
Exercise frequency	1.19	1.56
Exercise duration	28.28	28.30
Exercise intensity	3.28	1.58
IPAQ	50.22	42.18

Note. Gender coded 1 = Male, 2 = Female; Marital status coded 1 = Married/Living as Married, 2 = Single; Shift vs. Office coded Shift employee = 1, Office Employee = 2.

Table 2b. **Correlations for All Main Study Variables.**

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Age										
2. Gender	-.05									
3. Marital status	.12	-.07								
4. Education	.07	-.02	.29 **							
5. Shift vs. office	-.07	.24 *	.27 *	.45 **						
6. Overall Participation	-.21	.11	.08	.16	.23 *					
7. Extraversion	-.16	.25 *	.09	.15	.09	.13				
8. Agreeableness	.00	.22 *	.10	-.10	.14	.02	.15			
9. Conscientiousness	-.14	.04	.31 **	-.01	.04	.18	.26 *	.29 **		
10. Emotional Stability	.11	-.01	.35 **	.15	.17	.19	.08	.38 **	.33 **	
11. Openness	-.09	-.10	.01	-.05	-.08	-.08	.37 **	.30 **	.32 **	.30 **
12. Time/motivation barriers	.06	-.14	.09	-.04	-.15	-.06	-.22 *	-.01	.05	-.09
13. Exercise attitude barriers	.06	.19	.04	.01	.03	-.04	-.11	.07	.05	-.26 *
14. Internal barriers	.20	-.03	.15	-.06	-.18	-.22 *	-.18	-.02	.08	.01
15. External barriers	-.15	.02	.30 **	.03	.08	.14	.21 *	.01	.14	-.07
16. Exercise self-efficacy	-.20	-.13	.26 *	.28 **	.18	.13	.17	-.11	.22 *	.05
17. Exercise frequency	-.06	.04	.02	-.03	.08	.70 **	-.07	.04	.00	.13
18. Exercise duration	-.14	.11	.00	.01	.30 **	.38 **	.01	.06	.06	.20
19. Exercise intensity	-.14	-.10	.02	.05	.24 *	.36 **	.24 *	.18	.03	.11
20. IPAQ	-.04	-.32 **	-.12	-.13	-.39 **	-.02	-.03	.09	.14	.11

	11.	12.	13.	14.	15.	16.	17.	18.	19.
1. Age									
2. Gender									
3. Marital status									
4. Education									
5. Shift vs. office									
6. Overall Participation									
7. Extraversion									
8. Agreeableness									
9. Conscientiousness									
10. Emotional Stability									
11. Openness									
12. Time/motivation barriers	.35 **								
13. Exercise attitude barriers	.30 **	.46 **							
14. Internal barriers	.19	.33 **	.28 **						
15. External barriers	-.42 **	-.28 **	-.31 **	-.01					
16. Exercise self-efficacy	-.21	-.09	-.15	-.01	.07				
17. Exercise frequency	-.18	-.14	-.20	.03	.08	.41 **			
18. Exercise duration	-.28 *	-.36 **	-.43 **	.03	.32 **	.38 **	.46 **		
19. Exercise intensity	-.28 *	-.15	-.19	-.05	.05	.75 **	.57 **	.38 **	
20. IPAQ	.06	-.17	-.04	-.02	.08	.05	-.01	.09	.14

Note. Gender coded 1 = Male, 2 = Female; Marital status coded 1 = Married/Living as Married, 2 = Single; Shift vs. Office coded Shift employee = 1, Office Employee = 2.

Hypothesis 1: Barriers and exercise-related outcomes

Hypothesis 1 stated that perceived barriers will negatively predict exercise-related outcomes. Three hierarchical regression analyses were conducted to examine the relationships between exercise barriers and exercise-related

outcomes which were measured in terms of exercise frequency, exercise duration, and exercise intensity. In the present study participants' age, gender, marital status, education, type of employee (shift or office), and overall participation ("participation") were entered as covariates in this and all subsequent analyses. The four exercise barrier domains, time/motivation barriers, exercise-attitude barriers, internal barriers, and external barriers were entered into the model at step 2 of the analysis.

Results of the hierarchical regression analysis are reported in Table 3. Exercise frequency was entered into the first analysis as the criterion variable. Results revealed that time/motivation barriers had a significant negative relationship with the frequency of exercise-related behaviors, $\beta = -.19$, $p < .05$. The second analysis examined the relationship between exercise duration and barriers. Results did not reveal any significant relationships between any of the four exercise barrier domains and exercise duration.

The third analysis examined the relationship between exercise intensity and barriers. Results showed that internal barriers to exercise had a significant negative relationship with the intensity of exercise $\beta = -.26$, $p < .05$. Two of the barrier domains which were hypothesized to have negative relationships with exercise-related outcomes did, in fact, reveal negative relationships with exercise-related outcomes. External barriers and exercise-attitude barriers were not found to be significantly related to any of the exercise-related outcomes. Therefore, Hypothesis 1 was only partially supported.

Table 3. **Hierarchical Regression Results for Exercise-Related Behaviors Predicted by Perceived Barriers to Exercise.**

	Exercise Frequency		Exercise Duration		Exercise Intensity	
	β		*β*		*β*	
Predictors	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2
Age	0.11	0.09	-0.03	-0.02	-0.05	0.02
Gender	-0.04	-0.07	-0.01	0.00	-0.21	-0.17
Marital status	-0.02	0.03	-0.06	-0.05	-0.06	-0.03
Education	-0.15	-0.15	-0.17	-0.16	-0.11	-0.11
Shift vs. office	0.00	0.02	0.32 *	0.30 *	0.28 *	0.20
Overall Participation	0.74 **	0.76 **	0.33 **	0.32 **	0.33 **	0.26 *
Time/motivation barriers		-0.19 *		-0.09		-0.14
Exercise attitude barriers		0.03		-0.10		-0.20
Internal barriers		0.05		-0.01		-0.26 *
External barriers		-0.08		0.03		0.15
ΔR^2	0.51	0.04	0.22	0.02	0.21	0.17
ΔF	13.40 **	1.60	3.66 **	0.57	3.3 **	4.96 **
Adjusted R^2	0.47	0.49	0.16	0.14	0.14	0.29
F	13.40 *	8.93 *	3.66 **	2.38 *	3.3 **	4.37 **

Note. $N = 92$. * $p < .05$, ** $p < .01$.

Hypothesis 2: Personality, Barriers to Exercise, and Exercise Outcomes

Hypothesis 2 stated that the relationships between FFM personality traits and participation in an exercise program would be mediated by a person's perception of barriers to exercise. Multiple mediator analyses (Preacher & Hayes, 2008) were conducted to examine the mediating effect of the four barriers to physical activity domains on the relationship between the FFM personality traits (openness, conscientiousness, extraversion, agreeableness, and emotional stability) and exercise-related outcomes (intensity, duration, and frequency). The multiple mediation technique is appropriate for use in research involving small samples, because it uses a bootstrap resampling method to generate more stable statistical estimates than would be possible when using least squares regression.

In the present study 3,000 resamples were taken for these analyses. A total of fifteen multiple mediation analyses (five per exercise-related outcome) were

conducted to examine the relationship between personality and participation, while taking into account the mediating barrier variables. Intensity was entered as the criterion variable for the first five analyses, frequency for the next five, and duration for the last five. The four barrier domains were entered as the mediators in each analysis. The five personality traits were entered separately for each analysis as the predictor variable, with the other four being added to the existing covariates.

Tables 4 to 6 summarize the statistical output of these analyses. The results indicated no support for the meditational hypotheses when predicting exercise intensity or exercise duration. There was, however, support for a meditational effect on exercise frequency and extraversion with time/motivation barriers. Specifically, the relationship between extraversion and exercise frequency was fully and significantly mediated by time/motivation barriers (indirect effect = .07, SE = .04, BC 95% CI: .01, .18) while the direct effect of extraversion on exercise frequency was non-significant ($p > .05$). Time/motivation barriers also showed significant direct effects on exercise frequency when agreeableness (direct effect = -.24, $p < .05$), conscientiousness (direct effect = -.24, $p < .05$), emotional stability (direct effect = .09, $p < .05$), and openness (direct effect = -.24, $p < .05$) were entered into the model.

Internal barriers showed significant effects on exercise intensity with each of the five personality traits were entered into the model as predictors (all direct effects = -.40, $p < .05$). The adjusted R^2 of the whole model for each analysis involving exercise frequency and exercise intensity was significant at the $p < .01$

level. Also, the adjusted R^2 for the whole model for each analysis involving exercise duration, except for one, was significant at the $p < .05$ level. Overall, the mediational function of Hypothesis 2 was not supported with the exception of one instance of meditational effects from time/motivation barriers on the relationship between extraversion and exercise frequency.

Table 4. **Summary of Multiple Mediation Analysis on Exercise Intensity.**

			Bias Corrected	
	Point estimate	*SE*	Lower	Upper
Extraversion - Mediators - Exercise Intensity				
Time/Motivation	0.044	0.039	-0.010	0.145
Exercise Attitudes	0.021	0.036	-0.024	0.134
Internal	0.033	0.041	-0.025	0.160
External	0.014	0.029	-0.024	0.103
TOTAL	0.112	0.067	-0.009	0.264
Contrasts				
Time/Motivation vs. Exercise Attitude	0.023	0.057	-0.088	0.143
Time/Motivation vs. Internal	0.012	0.055	-0.138	0.107
Time/Motivation vs. External	0.031	0.047	-0.053	0.147
Exercise Attitude vs. Internal	-0.011	0.057	-0.160	0.079
Exercise Attitude vs. External	0.008	0.048	-0.073	0.124
Internal vs. External	0.019	0.053	-0.089	0.132
Full model Adjusted $R^2 = .35$, $F\ (15, 62) = 3.76$, $p < .01$				

			Bias Corrected	
	Point estimate	*SE*	Lower	Upper
Agreeableness - Mediators - Exercise Intensity				
Time/Motivation	-0.018	0.043	-0.137	0.049
Exercise Attitude	-0.015	0.038	-0.156	0.026
Internal	-0.012	0.062	-0.155	0.113
External	0.008	0.030	-0.026	0.112
TOTAL	-0.037	0.080	-0.186	0.139
Contrasts				
Time/Motivation vs. Exercise Attitude	-0.003	0.056	-0.138	0.102
Time/Motivation vs. Internal	-0.006	0.073	-0.159	0.142
Time/Motivation vs. External	-0.025	0.055	-0.164	0.066
Exercise Attitude vs. Internal	-0.002	0.073	-0.159	0.145
Exercise Attitude vs. External	-0.022	0.051	-0.176	0.048
Internal vs. External	-0.020	0.079	-0.208	0.130
Full model Adjusted $R^2 = .35$, $F\ (15, 62) = 3.76$, $p < .01$				

			Bias Corrected	
	Point estimate	*SE*	Lower	Upper
Conscientiousness - Mediators - Exercise Intensity				
Time/Motivation	-0.012	0.037	-0.125	0.042
Exercise Attitude	0.000	0.024	-0.045	0.053
Internal	-0.010	0.049	-0.137	0.069
External	0.003	0.023	-0.023	0.077
TOTAL	-0.019	0.069	-0.147	0.136
Full model Adjusted $R^2 = .35$, $F\ (15, 62) = 3.76$, $p < .01$				

			Bias Corrected	
	Point estimate	*SE*	Lower	Upper
Emotional Stability - Mediators - Exercise Intensity				
Time/Motivation	0.045	0.044	-0.011	0.169
Exercise Intensity	0.036	0.061	-0.062	0.188
Internal	0.027	0.060	-0.047	0.193
External	-0.023	0.043	-0.138	0.036
TOTAL	0.086	0.095	-0.073	0.308
Full model Adjusted $R^2 = .35$, $F\ (15, 62) = 3.76$, $p < .01$				

			Bias Corrected	
	Point estimate	*SE*	Lower	Upper
Openness - Mediators - Exercise Intensity				
Time/Motivation	-0.021	0.046	-0.118	0.078
Exercise Intensity	-0.002	0.043	-0.097	0.091
Internal	0.045	0.082	-0.095	0.246
External	-0.017	0.047	-0.136	0.055
TOTAL	0.005	0.106	-0.200	0.220
Full model Adjusted $R^2 = .35$, $F\ (15, 62) = 3.76$, $p < .01$				

Note. $N = 92$. Contrasts only reported for Significant Indirect Effects.

Table 5. **Summary of Multiple Mediation Analysis on Exercise Frequency.**

			Bias Corrected	
	Point estimate	*SE*	Lower	Upper
Extraversion - Mediators - Exercise Frequency				
Time/Motivation	0.066	0.039	0.008	0.175
Exercise Attitude	-0.004	0.037	-0.084	0.072
Internal	0.002	0.018	-0.024	0.060
External	-0.011	0.023	-0.091	0.014
TOTAL	0.054	0.060	-0.057	0.190
Full Model Adjusted R49, F (15, 63) = 6.02, p < .01				
Agreeableness - Mediators - Exercise Frequency				
Time/Motivation	-0.017	0.050	-0.136	0.070
Exercise Attitude	0.001	0.030	-0.053	0.076
Internal	0.000	0.019	-0.036	0.042
External	0.001	0.021	-0.034	0.054
TOTAL	-0.015	0.062	-0.153	0.099
Full Model Adjusted R49, F (15, 63) = 6.02, p < .01				
Conscientiousness - Mediators - Exercise Frequency				
Time/Motivation	-0.023	0.042	-0.127	0.048
Exercise Attitude	0.001	0.024	-0.044	0.061
Internal	-0.001	0.016	-0.048	0.023
External	-0.006	0.018	-0.079	0.011
TOTAL	-0.030	0.050	-0.142	0.060
Full Model Adjusted R49, F (15, 63) = 6.02, p < .01				
Emotional Stability - Mediators - Exercise Frequency				
Time/Motivation	0.059	0.044	-0.004	0.180
Exercise Attitude	-0.005	0.057	-0.118	0.117
Internal	0.001	0.020	-0.028	0.057
External	0.014	0.026	-0.019	0.104
TOTAL	0.068	0.069	-0.044	0.242
Full Model Adjusted R49, F (15, 63) = 6.02, p < .01				
Openness - Mediators - Exercise Frequency				
Time/Motivation	-0.030	0.052	-0.170	0.050
Exercise Attitude	0.000	0.035	-0.084	0.069
Internal	0.003	0.033	-0.040	0.111
External	0.015	0.039	-0.019	0.181
TOTAL	-0.013	0.071	-0.178	0.109
Full Model Adjusted R49, F (15, 63) = 6.02, p < .01				

***Table 6*. Summary of Multiple Mediation Analysis on Exercise Duration.**

			Bias Corrected	
	Point estimate	*SE*	Lower	Upper
Extraversion - Mediators - Exercise Duration				
Time/Motivation	0.825	0.773	-0.237	3.129
Exercise Intensity	-0.351	0.679	-2.296	0.691
Internal	0.152	0.462	-0.353	1.699
External	0.108	0.418	-0.539	1.302
TOTAL	0.733	1.171	-1.156	3.708
Full Model Adjusted R^2 = .15, F (15, 63) = 1.92, p < .05				
Agreeableness - Mediators - Exercise Duration				
Time/Motivation	-0.218	0.807	-2.568	0.942
Exercise Intensity	0.120	0.615	-0.658	2.124
Internal	0.005	0.506	-0.921	1.317
External	-0.009	0.371	-0.915	0.722
TOTAL	-0.102	1.019	-2.416	1.770
Full Model Adjusted R^2 = .15, F (15, 63) = 1.92, p < .05				
Conscientiousness - Mediators - Exercise Duration				
Time/Motivation	-0.287	0.689	-2.460	0.516
Exercise Intensity	0.062	0.483	-0.583	1.408
Internal	-0.085	0.445	-1.618	0.371
External	0.062	0.339	-0.363	1.302
TOTAL	-0.248	0.832	-2.250	1.223
Full Model Adjusted R^2 = .15, F (15, 63) = 1.92, p < .05				
Emotional Stability - Mediators - Exercise Duration				
Time/Motivation	0.735	0.833	-0.283	3.150
Exercise Intensity	-0.505	0.970	-2.807	1.219
Internal	0.076	0.512	-0.509	1.739
External	-0.135	0.513	-1.404	0.746
TOTAL	0.171	1.199	-1.979	2.852
Full Model Adjusted R^2 = .15, F (15, 63) = 1.92, p < .05				
Openness - Mediators - Exercise Duration				
Time/Motivation	-0.381	0.830	-2.859	0.602
Exercise Intensity	-0.001	0.836	-1.765	1.772
Internal	0.205	0.850	-0.711	3.562
External	-0.155	0.706	-2.575	0.668
TOTAL	-0.331	1.245	-3.507	1.729
Full Model Adjusted R^2 = .15, F (15, 63) = 1.92, p < .05				

Note. N = 92. Contrasts only Reported for Significant Indirect Effects.

Hypothesis 3: Barriers to exercise, exercise-related outcomes, and self-efficacy.

Hypothesis 3 stated that self-efficacy will moderate the relationship between perceived barriers and actual participation, such that this relationship will be weaker for individuals with higher self-efficacy and stronger for individuals with lower self-efficacy. All variables used in the model were first standardized. A hierarchical multiple regression analysis was then conducted to test these relationships. Table 7 shows the summary of these results. Exercise frequency was entered into the first analysis as the criterion variable. The adjusted R^2 of the model for exercise frequency at step 2 was non-significant ($\Delta R^2 = .49$; $p > .05$). However, results showed that time/motivation barriers did have a significant negative relationship with exercise frequency, ($\beta = -.27$, $p < .05$).

The adjusted R^2 of the model for exercise duration at step 2 was also non-significant ($\Delta R^2 = .10$; $p > .05$). Two of the variables entered as constants revealed a significant relationship with exercise duration, specifically, type of employee (shift or office) ($\beta = 2.14$, $p < .05$) and participation ($\beta = 2.40$, $p < .05$). No barriers were significantly associated with this outcome, thus the interaction hypothesis was not tested for exercise duration.

Exercise intensity was the criterion for the third model. The adjusted R^2 of the model for exercise intensity at step 2 was significant ($\Delta R^2 = .34$; $p < .05$). Results also revealed that agreeableness had a significant relationship with exercise intensity, ($\beta = .25$; $p<.05$). No barriers were significantly associated with this outcome, thus the interaction hypothesis was not tested for exercise intensity.

For the outcome of exercise frequency, the product of time/motivation barriers and exercise self-efficacy was entered into the model at step 3 of the previously described main effects model. Results (see Table 7) showed that this model was non-significant with an adjusted R^2 of whole model ($\Delta R^2 = .51$; $p > .05$). The product term coefficient was also non-significant ($\beta = .03$, $p > .05$). Thus, Hypothesis 3 was not supported.

***Table 7*. Hierarchical Regression Results for Exercise Frequency Predicted by Time/Motivation barriers and Exercise Self-Efficacy.**

	Exercise Frequency		
	β		
Predictors	Step 1	Step 2	Step 3
Age	0.10	0.06	0.06
Gender	-0.06	-0.04	-0.04
Marital Status	0.00	0.16	0.10
Education	-0.14	-0.09	-0.10
Shift vs. Office	0.01	-0.06	-0.05
Overall Participation	0.74 **	0.78 **	0.77 **
Extraversion		-0.20 *	-0.19
Agreeableness		0.06	0.05
Conscientiousness		-0.10	0.10
Emotional Stability		-0.04	0.03
Openness		0.16	0.16
Exercise Self-Efficacy		-0.09	-0.08
Time/Motivation		-0.28	-0.27 **
Time/Motivation*Exercise Self-Efficacy			0.03
ΔR^2	0.51	0.08	0.00
ΔF	13.29 **	2.03	0.08
Adjusted R^2	0.47	0.51	0.51
F	13.29 **	7.80 **	7.15 **

Note. $N = 92$. * $p < .05$, ** $p < .01$.

***Table 8*. Hierarchical Regression Results for Exercise Intensity Predicted by Exercise-Attitude barriers and Exercise Self-Efficacy.**

	Exercise Intensity		
	β		
Predictors	Step 1	Step 2	Step 3
Age	-0.04	0.03	0.03
Gender	-0.21	-0.21	-0.20
Marital Status	-0.06	-0.04	-0.04
Education	-0.12	-0.15	-0.13
Shift vs. Office	0.28 *	0.24 *	0.23 *
Overall Participation	0.36 **	0.36 **	0.38 **
Extraversion		0.17	0.15
Agreeableness		0.27 *	0.27 *
Conscientiousness		-0.17	-0.17
Emotional Stability		-0.15	-0.18
Openness		0.09	0.12
Exercise Self-Efficacy		0.21	0.19
Exercise-Attitude		-0.28 *	-0.31 *
Exercise-Attitude*Exercise Self-Efficacy			-0.06
ΔR^2	0.21	0.24	0.00
ΔF	3.35 **	4.32 **	0.24
Adjusted R^2	0.15	0.34	0.34
F	3.35 *	4.34 **	4.00 **

Note. $N = 92$. * $p < .05$, ** $p < .01$.

Discussion

The purposes of the present study were (a) to replicate the findings from a previous study conducted by Schwetschenau et al. (2008), that examined associations between barriers and corporate fitness center use, and (b) to further validate the Corporate Exercise Barriers Scale (C-EBS) that was developed by the authors for use in that same study. To further examine the "participation" outcome examined by Schwetschenau et al., the present study considered three possible exercise-related outcomes: frequency, duration, and intensity. The

personality traits of the five-factor model of personality were also examined along with exercise self-efficacy.

To address the first objective, an exploratory factor analysis was conducted so that the Corporate Exercise Barriers Scale (C-EBS) (Schwetschenau et al., 2008) could be further validated. Results indicated that the C-EBS is a reliable measure that contains four dimensions: time/motivation barriers, exercise-attitude barriers, internal barriers, and external barriers. These findings support the findings of Schwetschenau et al. regarding the structure of the C-EBS measure.

To address the second general objective, a series of regression-based analyses were conducted. For all of the analyses in the present study the same set of covariates were entered. These included age, gender, marital status, level of education, type of employee (shift or office), and an overall "participation" variable that measured dichotomously (yes/no) if the employee used the fitness facility and/or participated in company-sponsored wellness programs. Multiple mediation bootstrap analyses and hierarchical multiple regression analyses were conducted to examine the hypotheses of the present study. Perceived barriers were expected to have a negative relationship with exercise participation; barriers were expected to mediate the relationship between personality and exercise-related outcomes; and self-efficacy was expected to moderate the relationship between barriers and exercise-related outcomes.

A hierarchical regression analyses was conducted to test Hypothesis 1. External barriers and exercise-attitude barriers were not found to be significantly

related to any of the exercise-related outcomes. Time/motivation barriers and internal barriers that were hypothesized to have negative relationships with exercise-related outcomes did, in fact, reveal negative relationships with exercise-related outcomes of frequency and intensity. These findings contrast the previous findings by Schwetschenau et al. (2008). The previous study found that time/motivation barriers did not significantly account for variance in exercise sessions. They also reported external barriers to account for a significant proportion of variance in duration of the exercise session and membership.

One possible explanation for the difference in findings with time/motivation barriers is that the organizations used for collecting data in the current study and in the Schwetschenau et al. (2008) paper have different situations as far as accessibility and convenience. It is possible that the employees at the organization used by Schwetschenau et al. did not report as many time/motivation barriers because their exercise facilities were more accessible than those at the organization used for the present study. Further, internal barriers accounted for the variance in how intensely someone exercises.

In regard to the relationship between internal barriers and intensity, it is plausible that someone who perceives a higher level of internal barriers would most likely not exercise as intensely because the barriers, such as negative thoughts about body image or exercise ability, could keep exercise intensity low. It is also possible that internal barriers have more of an impact on a person's exercise-related behaviors once they are already in the act of exercising rather than before exercise behaviors begin. This would explain why those who report

higher levels of internal barriers reported lower level of exercise intensity and not lower levels of exercise frequency.

Results from the multiple mediation method used to test Hypothesis 2 revealed that there was only one instance where the relationship between personality and exercise-related outcomes was mediated by time/motivation barriers. Specifically, this mediation occurred between extraversion and the exercise-related outcome frequency. The relationship is such that someone who reports higher levels of extraversion will perceive fewer time/motivation barriers and, subsequently, will report a higher frequency of exercise-related behaviors. It is plausible that someone who has a higher level of extraversion could report fewer time/motivation barriers because they are better able to handle time or motivational demands and barriers. Each analysis of time/motivation barriers revealed a significant relationship with exercise frequency, however, time/motivation barriers did not act as mediators in these models because the relationship was significant for only one path. The same type of findings occurred with exercise intensity. Internal barriers were found to have a significant impact on exercise intensity in all analyses but only through one path.

The lack of support for mediation in the present study may lead to another avenue of research involving personality as a moderator on the relationship between barriers and exercise-related behaviors. Although the mediational hypothesis was not supported, some results of the multiple mediation analyses support the idea that personality, barriers, and exercise-related behaviors may play roles other than those proposed in the current study. It is worth pointing out that

the three covariates entered into the mediation models, participation, type of employee (shift or office), and gender, accounted for large proportions of the overall variance in the exercise outcomes. This partially explains why the overall models in the multiple mediation analyses were statistically significant, despite nonsignificant linkages between particular FFM traits and the exercise outcomes.

Finally, self-efficacy was proposed as a moderator on the relationship between barriers and exercise-related outcomes (Hypothesis 3). Hierarchical regression analyses were used to test these relationships. Results showed that there was no support for moderation for any of the models. Self-efficacy, defined as a person's belief that he or she is or is not capable of performing the behavior necessary to accomplish a specific task or achieve a particular goal (Bandura, 1986; Maddux et al., 1986), was thought to be a logical moderator over how someone perceives barriers and their ability to then overcome these barriers and participate in exercise-related behaviors. This particular study did not find support for this theory, however, that does not mean such is not the case. Perhaps a larger sample size, use of a different population, and/or use of multiple organizations for collecting data would result in findings that support self-efficacy as a moderator.

Limitations and Future Directions

The present study has several limiting factors that can partially explain the lack of support for the hypotheses. First, because of the small sample size, the power of the study was relatively low. A similar study with a larger sample size would allow for more powerful results that would enable researchers to better

assess the hypotheses proposed in this study. The hypotheses proposed for the current study, although mostly rejected, are still believed by the researchers to be potentially valid hypotheses. Future research with similar hypotheses should build upon this study by employing a larger sample size from multiple organizations.

Time is always a limiting factor. The present study was completed within a time frame that did not allow for data to be collected from multiple organizations. As with most organizations, access to the entire population of employees was not granted. Because of lack of access to the entire population the sample size and, subsequently, the response-rate was lower than hoped for.

Self-report methods were used to measure exercise-related outcomes. Past research supports the validity and reliability of self-report measures in assessing exercise behavior when compared with objective measures (Blair et al., 1985). Although self-report methods are generally supported, common-method bias could be a potentially limiting factor in this study. Researchers have found that a significant proportion of variance can be attributed to the methods used (Meade, Watson, & Kroustalis, 2007). In an effort to decrease common-method bias, this study employed multiple measures, negatively worded items, and a randomized order of questions. Future research should use different measures and/or methods other than self-report to measure the frequency, duration, and intensity of exercise-related behaviors.

Future research on the correlates of healthy behaviors could examine the relationship between social support and health- and exercise-related behaviors. Social support has been identified in past research (i.e. Resnick & Orwig, 2002)

as being an important determinant of participation in exercise behaviors. Future research on barriers to participation in health- and exercise-related behaviors should focus on the social support perceived the subjects being studied. Examining the mode, or type, of exercise is another avenue researchers can take when looking at the relationships between barriers to exercise and actual participation in exercise-related behaviors. By examining the mode of exercise, researchers may be better able to determine how intensely someone is actually exercising, rather than relying on self-report.

Implications

The present study adds to the growing body of literature on personality, barriers, self-efficacy, and exercise-related outcomes. One goal of the present study that was met was to further validate the Corporate Exercise Barriers Scale (C-EBS) (Schwetschenau et al., 2008). The C-EBS was proven to reliably measure barriers to exercise-related behaviors. Also, smaller relationships between certain personality traits, barriers, and exercise-related outcomes were found to be significant. These findings require more research and further analysis to be validated.

Although the hypotheses were not fully supported, findings from the study should help to point future research on these variables and the relationships among them in the right direction. Some of the covariates used in the multiple mediation analyses, specifically gender, overall participation, and type of employee (shift or office), were found to play a significant role in the models that examined the relationship between personality, barriers, and exercise-related

behaviors. These particular findings point research in the direction of examining differences between male and female perception of barriers and how their perceptions affect their exercise-related behaviors. Also, findings suggest that shift and office workers may display distinct differences in the type of barriers that they perceive and these barriers may also cause them to act in different ways when it comes to participation and/or non-participation in exercise-related behaviors.

In sum, findings from this study support the validity of the Corporate Exercise Barriers Scale (C-EBS) as an acceptable and useful tool for measuring barriers to exercise-related behaviors in the workplace. Results also reveal that the barriers perceived by people before, during, and after their exercise experience can, and often do, have an impact on future health-related behaviors. Future research on health promotion could expand on the findings of this study to examine further the relationships between personality, barriers, self-efficacy, and engagement in health-related behaviors.

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APPENDIX A: IRB form

THE UNIVERSITY of TENNESSEE CHATTANOOGA

Institutional Review Board
Dept. 4905
615 McCallie Avenue
Chattanooga, TN 37403-2598
Phone: (423) 425-4443

MEMORANDUM

TO: Eliza Hegwood **IRB # 09-022**

FROM: Lindsay Pardue, Director of Research Integrity
M. D. Roblyer, IRB Committee Chair

DATE: February 16, 2009

SUBJECT: IRB # 09-022: Personality, Self-Efficacy, and Barriers to Participation in Health Promotion Program

The Institutional Review Board has reviewed and approved your application for Annual Renewal for the IRB project listed above.

You must include the following approval statement on research materials seen by participants and used in research reports:

The Institutional Review Board of the University of Tennessee at Chattanooga (FWA00004149) has approved this research project # 09-022.

Please remember that you must complete Form C when the project is completed or provide an annual report if the project takes over one year to complete. The IRB Committee will make every effort to remind you prior to your anniversary date; however, it is your responsibility to ensure that this additional step is satisfied.

Please remember to contact the IRB Committee immediately and submit a new project proposal for review if significant changes occur in your research design or in any instruments used in conducting the study. You should also contact the IRB Committee immediately if you encounter any adverse effects during your project that pose a risk to your subjects.

For any additional information, please consult our web page http://www.utc.edu/irb or email instrb@utc.edu

Best wishes for a successful research project.

APPENDIX B: Measures (Complete Actual Survey)

Informed Consent Form

Purpose of the study
This study is being conducted by Eliza Hegwood, a graduate student at the University of Tennessee at Chattanooga, under the supervision of Dr. Chris Cunningham. The purpose is to examine the relationship between personality characteristics and barriers that keep people like you from participating in company-sponsored health promotion programs.

What will I have to do?
If you agree to participate you will be asked to complete a brief 15-minute survey that includes questions about your personality and general health perceptions, as well as a few demographic questions to help us describe the final group of respondents in general terms.

What are the risks to me?
There are very few risks to you if you participate in this study. If any question makes you uncomfortable, you can skip that question or withdraw from the study completely. If you decide to quit at any time before you have finished the survey, your answers will NOT be recorded. We really need complete surveys, though, so we greatly appreciate your full cooperation.

Confidentiality
Your responses will be kept completely confidential and anonymous (no one will know your name or identity and your answers will only be viewed by the researchers). Your employer will only see an average summary across all respondents when the study is finished.

Voluntary participation
Your participation in this study is completely your choice. You may stop or withdraw at any time.
You must be at least 18 years old to participate in this study.

How the findings will be used
Results of the study will be used to improve the quality of health promotion programming in your organization and to educate other professionals in educational settings or professional conferences, and in professional journals.

Contact information:
If you have any concerns or questions about this study, please contact Eliza Hegwood at
Eliza-Hegwood@utc.edu or Dr. Chris Cunningham at Chris-Cunningham@utc.edu or 423-425-4264.
You may also contact the head of the UTC IRB committee, Dr. Roblyer at 423-425-5567.

By completing and returning this survey, you acknowledge that you have read this information and agree to participate in this research, with the knowledge that you are free to withdraw your participation at any time without penalty.

Thank you in advance for you assistance and participation. PLEASE COMPLETE AND RETURN BY:_____

Sincerely,

Eliza Hegwood

Chris Cunningham, Ph.D.
The University of Tennessee at Chattanooga

This project has been approved for compliance with ethical guidelines by the Institutional Review Board at the University of Tennessee at Chattanooga, #09-022

Thank you for being honest and complete with all of your responses. PLEASE NOTE: For all responses that require you to select from a set of options you can mark an "X" -- there is no need to fill-in the bubbles completely

Do you participate in and/or use your company-sponsored fitness/wellness...

	Yes	No
...program(s) (example: biggest loser competition)?	○	○
...facilities (example: exercise equipment)?	○	○

If "No" to either question please briefly state why not:

These questions refer to your exercise behaviors. Please enter numbers (example: 3) rather than words when responding.

How often (times per week) do you use the company-sponsored exercise facilities?

How long (in minutes) would you say your typical exercise experience lasts?

How would you rate your typical exercise experience with regards to level of intensity?

○ Not at all intense ○ A little bit intense ○ Somewhat intense ○ Moderately intense ○ Quite a bit intense ○ Very intense ○ Extremely intense

Please indicate your level of agreement or disagreement with each of the following statements, by making a mark on the scale provided.

I am discouraged from participating in my company's sponsored wellness activities or using the sponsored exercise facilities because...

	Disagree strongly	Disagree moderately	Disagree somewhat	Neutral	Agree somewhat	Agree moderately	Agree strongly	N/A
...my job demands don't allow me to take the time to participate	○	○	○	○	○	○	○	○
...I don't have time due to family	○	○	○	○	○	○	○	○
...I'm too stressed	○	○	○	○	○	○	○	○
...I'm too tired	○	○	○	○	○	○	○	○
...I don't feel motivated enough to work out	○	○	○	○	○	○	○	○
...I don't like the way exercise makes me feel	○	○	○	○	○	○	○	○
...I don't want to improve my health or fitness	○	○	○	○	○	○	○	○
...I don't see the benefit of exercise	○	○	○	○	○	○	○	○
...I am embarrassed to exercise around co-workers	○	○	○	○	○	○	○	○
...I am embarrassed for others to see my body	○	○	○	○	○	○	○	○
...I am embarrassed to wear non-professional clothing	○	○	○	○	○	○	○	○
...my current health problems prevent me from exercising	○	○	○	○	○	○	○	○
...traveling prevents me from using the company-sponsored fitness/exercise facilities	○	○	○	○	○	○	○	○
...membership costs are too high	○	○	○	○	○	○	○	○
...the company-sponsored fitness/exercise facility is not nice enough	○	○	○	○	○	○	○	○
...fitness/exercise facility hours are inconvenient	○	○	○	○	○	○	○	○
...I don't know what exercises to do	○	○	○	○	○	○	○	○

Here are a number of personality traits that may or may not describe you. On the scale provided, please select the degree to which you agree or disagree that EACH PAIR of words applies to you.

I see myself as...

	Disagree strongly	Disagree moderately	Disagree a little	Neutral	Agree a little	Agree moderately	Agree strongly
...extraverted, enthusiastic	○	○	○	○	○	○	○
...critical, quarrelsome	○	○	○	○	○	○	○
...dependable, self-disciplined	○	○	○	○	○	○	○
...anxious, easily upset	○	○	○	○	○	○	○
...open to new experiences, complex	○	○	○	○	○	○	○
...reserved, quiet	○	○	○	○	○	○	○
...sympathetic, warm	○	○	○	○	○	○	○
...disorganized, careless	○	○	○	○	○	○	○
...calm, emotionally stable	○	○	○	○	○	○	○
...conventional, uncreative	○	○	○	○	○	○	○

How long have you worked within this company (to nearest year)?

[ ]

I work as a...

○ Shift employee ○ Office employee

I am paid by the organization...

○ With a Salary ○ By the hour

Please enter your age:

(in years) [ ]

I am...

○ Male ○ Female

What is your primary ethnicity/race?

○ Hispanic or Latino
○ Black or African American (Not Hispanic or Latino)
○ Asian (Not Hispanic or Latino)
○ White (Not Hispanic or Latino)
○ Native Hawaiian or Other Pacific Islander (Not Hispanic or Latino)
○ American Indian or Alaska Native (Not Hispanic or Latino)

I am...

○ Married/Living as married ○ Single ○ Divorced/widowed

Please indicate the highest level of education that you've obtained:

- ○ Some high school
- ○ High school/GED
- ○ Some college
- ○ Bachelor's degree (example: B.A., B.S.)
- ○ Some graduate school
- ○ Master's degree (example: M.A., M.S., M.B.A.)
- ○ Terminal degree (example: Ph.D., Ed.D)

Please rate your confidence regarding each of the following statements about your eating and exercise habits on the scale provided.

How confident are you that you would be able to . . .

	Not at all	A little bit	Somewhat	Moderately	Quite a bit	Very	Completely
1. Follow your eating plan when you are in a bad mood (e.g., anxious, depressed, irritable)?	○	○	○	○	○	○	○
2. Follow your eating plan when you are bored?	○	○	○	○	○	○	○
3. Follow your eating plan on the weekends?	○	○	○	○	○	○	○
4. Follow your eating plan when you are at a party or out to dinner with friends or family?	○	○	○	○	○	○	○
5. Follow your eating plan when many appealing high-calorie foods are available?	○	○	○	○	○	○	○
6. Follow your exercise plan when you get very busy?	○	○	○	○	○	○	○
7. Follow your exercise plan when it interferes with spending time with your friends or family?	○	○	○	○	○	○	○
8. Follow your exercise plan when you are sore or tired?	○	○	○	○	○	○	○
9. Follow your exercise plan when you are in a bad mood (e.g., anxious, depressed, irritable)?	○	○	○	○	○	○	○
10. Follow your exercise plan when your exercise workout is not enjoyable?	○	○	○	○	○	○	○

We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spent being physically active in the LAST 7 DAYS. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the VIGOROUS activities that you did in the last 7 days. VIGOROUS physical activities refer to activities that take hard physical effort and make you breathe much harder than normal.

1. During the LAST 7 DAYS, on how many days did you do VIGOROUS physical activities like heavy lifting, digging, aerobics, or fast bicycling?

Days per week (please enter a number, example: 3): ☐

If you have no vigorous job-related physical activity please enter a 0 here and SKIP TO QUESTION 3 ☐

2. How much time did you usually spend doing VIGOROUS physical activities on one of those days?

Hours per day (example: 2): ☐

Minutes per day (example: 30): ☐

Think about all the MODERATE activities that you did in the LAST 7 DAYS. MODERATE activities require moderate physical effort and make you breathe somewhat harder than normal. Think only about those moderate actvities that you did for at least 10 minutes at a time.

3. During the LAST 7 DAYS, on how many days did you do MODERATE physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.

Days per week (example: 3): ☐

If you had no moderate job-related physical activity please enter a 0 here and skip to Question 5 ☐

4. How much time did you usually spend doing MODERATE physical activities on one of those days?

Hours per day (example: 1): ☐

Minutes per day (example: 25): ☐

Think about the time you spent WALKING in the LAST 7 DAYS. This includes at work and at home, walking from place to place, and any other walking you might do for recreation, sport, exercise, or leisure.

5. During the LAST 7 DAYS, on how many days did you WALK for at least 10 minutes at a time?

Days per week (example: 4): ☐

If you did no walking, please enter a 0 here and SKIP TO QUESTION 7: ☐

6. How much time did you usually spend WALKING on one of those days?

Hours per day (example: 3): ☐

Minutes per day (example: 45): ☐

This last question is about the time you spent SITTING on weekdays during the LAST 7 DAYS. Include time spent at work, home, and during leisure time. This may include time at a desk, visiting friends, reading, or watching television.

7. During the LAST 7 DAYS, how much time did you spend SITTING on a normal week day?

Hours per day (example: 3): ☐

Minutes per day (example: 45): ☐

If you have any suggestions/comments regarding ways to improve the wellness promotion efforts at SCT please share them here:

☐

THIS IS THE END OF THE SURVEY. THANK YOU FOR PARTICIPATING!